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ABSTRACT

This study investigated how urban and rural children who lived along a major river in Brazil understand and value their relationship with the natural environment. Forty-four Brazilian children in fifth grade were interviewed, and background of the city and village they lived in was ascertained. Each child was individually administered a semi-structured interview. The issues under investigation focused on children's: (1) awareness of environmental problems; (2) beliefs about whether certain acts of environmental degradation harmed various parts of nature; (3) concern if such harm occurred; and (4) environmental actions. In addition, a hypothetical scenario was presented to assess the presence or absence of moral obligation in demonstrated environmental sensitivities and commitments based on a wide range of measures. Additional analyses showed striking similarities between this Brazilian population and a population of African-American urban children in the United States interviewed in an earlier study with comparable methods. The study considered the moral developmental theory, which supports the proposition that, in important ways, individuals' moral reasoning across cultures is similarly structured by concerns for human welfare, fairness, and rights. Contains 56 references. (BAC)

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Running head: ALONG THE RIO NEGRO

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Along the Rio Negro:

Rural and urban Brazilian children's environmental views and values

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Paper presented at the April 1995 biennial meeting
of the Society for Research in Child Development, Indianapolis.

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Abstract

Children in urban and rural parts of the Brazilian Amazon were interviewed in Portuguese on how they understand and value their relationship with the natural environment. Forty-four fifth grade children (mean age, 13-8) participated. Results showed that children in both locations were aware of environmental problems and discussed environmental issues with their family. Children believed that throwing garbage in the Rio Negro harmed various parts of the environment (namely, birds, insects, the view of the river, and people who live along the river), and they cared that such harm might occur. Moreover, children believed that throwing garbage in the Rio Negro constituted a violation of a moral obligation. Based on five measures, children supported the conservation of the Amazon rain forest. Additional analyses showed striking similarities between this Brazilian population and a population of African-American urban children in the United States interviewed with comparable methods in an earlier study. Discussion draws on moral developmental theory to help chart a cross-cultural framework for understanding the ontogenesis of children's relationship with nature.

Along the Rio Negro:

Brazilian Children's Environmental Views and Values

To date, developmental psychologists have remained largely silent in seeking to understand ontogenetically the human relationship to nature. This lack of interest is surprising given the increasing importance of environmental issues, locally and globally, and the increasing attention the issues are receiving in other disciplines (Lawrence, 1993; Nelson, 1983; Orr, 1993; Rolston, 1989; Wilson, 1992). Moreover, it may be that deep and abiding environmental sensitivities and commitments are formed during childhood (Kellert, 1985; Nabhan, 1994; Tanner, 1979; Ulrich, 1993), and, if so, developmental psychology has an important place in such an account. In this direction, the current study investigated how urban and rural children who lived along a major river in the center of the Amazon region in Brazil understand and value their relationship with the natural environment.

This study builds on recent research we conducted with African-American children from an urban elementary school in Houston, Texas (Kahn & Friedman, in press). Contrary to a common stereotype held by some Blacks and Whites alike, the results showed -- from what we shall refer to as the "Houston study" -- that the Black children had an awareness of, interests in, and moral commitments toward the natural environment. Such perspectives were held along side of, and often coordinated with, other types of social and moral judgments. One third-grade girl, for example, said that it was wrong to throw garbage in the local bayou (waterway); at the same time she described a bayou in the following terms: "[A bayou is] where turtles live and the water is green because it is polluted. Some people go down there and pee in the water. Like boys, they don't have no where to pee, and drunkers, they'll go do that, too. And sometimes they'll take people down and rape them, and when they finished, they might throw 'em in the water or something." Thus this child, like others, expressed views of how nature was interwoven with the harsh realities of living in the inner-city of Houston.

In the Houston study, two overarching forms of reasoning emerged for why the environment should be protected. One approach grounds environmental considerations in homocentric (human-oriented) terms. From this approach, for example, children often reasoned that the local bayou should not be polluted because of considerations based on human welfare (e.g., that polluting nature will result in people getting sick), and aesthetics (e.g, that people enjoy the beauty of nature), personal interests (e.g., that animals are fun to play with, and they would be hurt or killed by polluting a bayou). Such findings are consistent with Kellert's (1985, 1993) research on children's attitudes toward nature which has yielded a topology of nine attitudes including those that are utilitarian (that nature has utility to humans), negativistic (that one needs to protect oneself from the harm nature can bring), and aesthetic (that nature offers beauty to humans).

With much less frequency, children in the Houston study drew on a biocentric form of reasoning wherein nature itself is granted moral standing. For example, from this approach children reasoned that nature has intrinsic value that does not derive solely from human interest, or that nature has rights and deserves respect. Further analyses suggested that in children's development biocentric reasoning may hierarchically integrate homocentric reasoning, and emerge more fully in adolescence. For example, when children accorded rights to animals, such reasoning was not in contradiction to according rights to humans, but often enlarged the scope of what has moral standing (e.g., "bears are like humans, they want to live freely"). Such a developmental progression is consistent with research by Beringer (1992) who often found forms of biocentric reasoning within an environmentally-oriented population of late adolescents.

The results from the Houston study suggest that the serious constraints of living in an inner-city community cannot easily squelch these children's diverse and rich appreciation for nature, and moral responsiveness to its preservation. Yet an important question remains unanswered. To what extent are the analyses and results from the Houston study marked by culture and context, and to what extent might they suggest universal features of children's development?

The current study directly takes up this question by employing many of the same methods used in the Houston study with fifth grade children in an urban (Manaus) and rural (Novo Ayrao) location in the Amazon region of Brazil. Both the urban and rural locations were particularly appropriate because they each bordered a river (the Rio Negro) and thus, in this regard, matched the Houston location which bordered a bayou.

Some of the issues under investigation focused on children's awareness of environmental problems, beliefs about whether certain acts of environmental degradation harmed various parts of nature, and whether the children cared if such harm occurred. Other issues focused on children's environmental actions, such as whether they discussed environmental issues with their family, or did anything to help the environment. In addition, a hypothetical scenario was employed that involved throwing garbage in the Rio Negro, and assessments were made of whether children believed such an act violated a moral obligation (Kahn, 1992; cf. Kohlberg, 1971; Turiel, 1983). Children's environmental moral reasoning was also systematically elicited. Finally (and not pursued in the Houston study), issues focused on children's views and values toward the Amazon rain forest. Taken together, it was expected that the results would inform on Brazilian children's environmental moral sensitivities and commitments, and contribute to forming a cross-cultural framework for understanding the ontogenesis of children's relationship with nature.

Methods

Subjects and Research Sites. Forty-four fifth grade Brazilian children were interviewed (mean age, 13-8). Thirty children (16 females and 14 males) came from within Manaus, the capital of the State of Amazonas, and 14 children (7 females and 7 males) from Novo Ayrao, a small remote village. Both locations border the Rio Negro, and are located roughly in the center of the Amazon region.

With nearly one million inhabitants, Manaus is the largest Brazilian city within the vast Amazon rain forest. The city is located thirteen miles above the junction of the Rio Negro and the Amazon River, and it is at this junction that the Amazon River is said to begin. Manaus services a growing eco-tourist trade from North America and Europe. The city is also considered the center of the

region's electronics industry, and it enjoys tax-free imports due to the government's efforts to spur international development in the region. Yet, even given this economic development, for many Brazilians Manaus remains an emblem of the economic disillusionment that plagues Brazilian society (Nyop, 1983; Potter, 1989). At the turn of the century, approximately 90% of the world's rubber supply passed through the city, resulting in rapid economic and cultural growth. When the market crashed in 1925, this growth came to an abrupt and debilitating halt (Beresky, 1991). Currently, within Manaus a great deal of poverty exists, as do poor educational opportunities, jobs, and medical care. In some sections of the city, refuse and litter are readily apparent, and sickness manifests (e.g., cholera, malaria, and yellow fever). The urban children we interviewed were enrolled in a school in Sao Raimundo: a neighborhood of only modest economic means in comparison to the city as a whole. Some of these children, for example, lived near creeks that some people used as their primary means for garbage and sewage removal.

In contrast, Novo Ayrao is a small, remote village with approximately 4000 inhabitants. The village could only be reached by means of an eight hour boat ride up the Rio Negro from Manaus. The villagers' primary economic activities include fishing and the extraction of forest products, most notably lumber. The landscape is largely pristine with only small areas cleared for housing, commerce, and dirt roads. There is little visible litter or garbage; and according to inhabitants with whom we talked neither crime nor drugs are present in the community. The children we interviewed attended one of the village's two schools.

Procedures and Measures. Each child was individually administered a semi-structured interview (cf. Damon, 1977; Lave, 1988; Nucci & Turiel, 1993; Ogbu, 1977; Piaget, 1929/1960; Saxe, 1990). The interviews were conducted in Portuguese, and tape-recorded. Later the interviews were translated and transcribed for analysis. The translator/transcriber was a native Brazilian who currently lives in the United States and is fluent in both Portuguese and English; she was otherwise unconnected to this research project.

The interview proceeded in the following manner. First, children were asked about their views and values toward animals (e.g., Are animals an important part of your life? If so, how? Do you ever think about animals or ever get a chance to play with animals? Why are animals important or not important?) Similar questions followed about children's views and values toward plants. Second, children were asked whether they were aware of any environmental problems in general, and whether any environmental problems affected them directly. Third, children were asked about possible conversations they might have with family members about environmental issues (e.g., Does your family talk about the environment much? If so, what kinds of things do you talk about? Have you ever started a conversation about nature or the environment? If so, what about?). Fourth, children were asked about any current practices they or their family engage in to help the environment (Do you or your family currently do anything to help the environment? If so, what?).

At this point in the interview, questions shifted to a hypothetical scenario of polluting a river: "The Case of the Polluted Waterway." To assess the presence or absence of moral obligation, three conditions were presented. First, children were asked to judge whether it was all right or not all right for a person to throw his or her garbage in the local river. The child's own gender was used to refer to the hypothetical protagonist. Second, children's initial judgments about throwing garbage in the river were pitted against local social conventions that legitimated the practice under discussion ("Let's say that in your neighborhood everyone throws their garbage in the river; would that be all right or not all right?). Third, children were asked to judge the validity of such routine conventional practices when they occur in a different, far off geographical location ("Let's say that in X a whole neighborhood throws its garbage in the river. That's one of the ways that they handle their garbage. In this case, do you think it is all right or not all right for the whole neighborhood to throw its garbage in the river?). For these evaluative questions, children were asked to explain their reasons. Multiple reasons were encouraged.

Next a series of questions focused on ways children believe that throwing garbage in the local river (the Rio Negro) would harm other parts of the natural environment. Questions directly pertained to birds ("Do you think that throwing garbage in the river is harmful or not harmful to the birds that live

around the river?"), insects, aesthetics (on the view of the river), and the people who live along the river. Moreover, after each of these questions in which harm was identified, children were asked whether it mattered to them if such harm occurred.

Finally, questions were asked that pertained to children's views toward the Amazon rain forest. Questions focused on children's previous experience in the forest ("Have you ever been into the forest?"); knowledge of the forest's use for humans ("What does the forest provide for people?" "Do you think we need the forest? Why?"); awareness and judgments of current logging practices ("Do you think that people are cutting down the forest now?" If yes, "Is that all right or not all right? Why?" "Do you think it is possible for humans to use the forest without destroying it? How? Do you think the forest will exist forever?"); and judgments about possible personal and governmental interventions ("Should you try to stop the people who are cutting the forest?" "Should the government try to stop the people who are cutting the forest?").

Coding and Reliability. A coding manual was first developed from the responses of 50% of the children, divided across urban and rural children, and females and males. The coding manual was then applied to the responses from the other 50% of the children. The results from both groups were combined for analyses. Three types of responses were coded. Dichotomous evaluation responses (e.g., all right/not all right; aware/not aware of environmental problems; matters/does not matter that insects would be harmed), content responses (e.g., animals, plants, garbage, water pollution, and air pollution), and justifications for the evaluative responses (e.g., an appeal that animals have rights). The justification coding system largely replicated the coding system used in the Houston study which, in turn, had drawn on coding systems developed elsewhere (Davidson, Turiel, & Black, 1983; Friedman, 1988; Kahn, 1992; Kahn & Turiel, 1988). Summary descriptions on the most general level of the justification coding system are presented in Table 1.

Insert Table 1 about here

An independent coder trained in the use of the coding manual recoded 12 interviews (27%), divided across urban and rural children, and females and males. In total, 312 evaluations, 68 content responses, and 92 justifications were recoded. Intercoder reliability was assessed through testing Cohen's Kappa for statistical significance at the .05 level. All tests were statistically significant. For evaluations, intercoder agreement was 96% (Z = 16.27). For content responses, intercoder agreement was 91% (for the four separate questions analyzed, Z = 5.79, 5.47, 4.39, and 11.84). For justifications on the level reported in Table 1, intercoder agreement was 81% (Z = 8.75).

Comparison to the Houston Study's Methods. As noted in the introduction, many of the above procedures and measures were taken from a recent study with children in grades 1, 3, and 5 conducted in Houston, Texas. It was our intention to perform direct comparisons between the Brazilian children (all of whom were in fifth grade) and the fifth grade children in the Houston study. Thus we provide here other pertinent information on the Houston study's methods.

In this earlier study, 72 children were interviewed, 24 children (12 males and 12 females) in each of three grade levels: first, third, and fifth (mean ages, 7-5, 9-6, and 11-4). Children came from an economically impoverished urban elementary school in Houston, Texas. Virtually all of the students attending the school were Black (>99%) and most received the free lunch program (91%). Based on TEAMS assessment, more than 60% of the students were considered low-performing.

The interview stimuli largely paralleled that used with the Brazilian children. One difference involved the wording of certain questions to allow for comparable meanings. For example, while the Brazilian children were asked about polluting the Rio Negro (the major waterway in their locale), the Houston children were asked about polluting a local bayou (a major waterway about half a mile from the children's school). Another difference was that in the Brazilian study we asked a series of additional questions that pertained to children's views toward the Amazon rain forest. It can be assumed that when direct comparisons are made between the Brazilian and Houston data that the comparisons are based on comparably framed questions and analyses.

Results

Non-parametric tests were used for tests of statistical significance of the categorical data (see Marascuilo & McSweeney, 1977; cf. Helwig, 1995; Kahn, 1992). No gender differences were found, and thus gender data were collapsed. When appropriate, categorical data was converted to score data, and then analyzed by t tests.

Children's Environmental Profile. As shown in Table 2, the results profile ways in which these children were aware of environmental problems, discussed environmental issues with their family, believed certain acts are harmful to the environment, and cared that such harm might occur. Virtually all of the children in Manaus and Novo Ayrao said that animals (100% and 100%, respectively) and plants (97% and 100%) played an important part in their lives. The majority of children from both locations were aware of environmental problems generally (69% and 57%) and that affected themselves or their community (81% and 86%). Of children in this latter category, children spoke of concerns that focused on plants and forests, such as the large-scale burning of the Amazon jungle (53% and 56%), air pollution (24% and 33%), harm to animals (12% and 11%), and garbage or litter (12% and 0%). The majority of children discussed environmental issues with their family (62% and 64%). Of children in this latter category, children said they talked about plants and forests (46% and 47%), animals (29% and 27%), air pollution (14% and 7%), water pollution (0% and 7%), and garbage and litter (0% and 7%). Children in Novo Ayrao (79%) more often said that they acted to help solve environmental problems than did children in Manaus (41%). X^2 (1, N = 43) = 5.25, $p < .02$. Children's reported environmental actions included planting trees or in some way caring for plants and trees (50% and 85%), caring for animals (21% and 15%), and influencing other people to be environmentally responsible (21% and 0%).

In another series of questions, children were asked to imagine that their entire community threw garbage in the Rio Negro. Results showed that the majority of children believed that harmful effects would result for birds (97% and 86%), insects (57% and 64%), the view (97% and 100%), and the people alongside the river (93% and 100%) In addition, of those children who believed that such harm would occur, the majority said that it would matter to them if such harm occurred for birds (96% and

100%), insects (61% and 58%), the view (93% and 92%) and the people alongside the river (89% and 85%).

Insert Table 2 about here

To provide an overall assessment of these children's environmental profile, and to test in one place for effects of location (Manaus vs. Novo Ayrao), ten of the above questions were summed as a single score, reflecting the degree of each child's pro-environmental views and values. The questions included those that pertained to whether the children were aware of environmental problems, discussed environmental issues with their family, valued aspects of nature, and acted to help the environment. For each question, an affirmative response received a score of one, a negative response a score of zero, and then the scores were summed across the 10 questions. Results showed that out of a possible score of 10 (the most pro-environmental score), the Manaus children as a group scored 7.03 and the Novo Ayrao children as a group scored 7.50. A t test showed no significant difference between the two groups.

Children's Views and Values Toward the Amazon Rain Forest. The results showed that children in both locations had understandings of and sympathies toward the Amazon rain forest. All of children (100%) in both Manaus and Novo Ayrao locations believed that humans need the forest, and virtually all of the children (93% and 100%) could name at least one thing the forest provided. Of children in this latter category, children said that the forest provided food (33% and 32%), clean air or oxygen (17% and 19%), lumber (7% and 16%), medicine (17% and 7%), animals (10% and 10%), shade (2% and 10%), and beauty (5% and 0%). In turn, the majority of children in both locations believed that people are currently cutting down the rain forest (83% and 100%), that such actions are wrong (83% and 79%), that the government should stop the people who are cutting down the rain forest (96% and 92%), that they themselves should take some action to help stop the cutting of the rain forest (88% and 85%), that there is a way to use the forest without destroying it (72% and 86%), and that the rain forest will

exist forever (64% and 64%). Less children in Manaus than Novo Ayrao had been into the rain forest at some point in their lives (34% to 71%). X^2 (1, N = 43) = 5.18, p < .03.

To provide an overall assessment of these children's conservation views and values, and to test for effects of location (Manaus vs. Novo Ayrao), all of the five above questions which pertained to conservation were summed as a single score. One question focused on whether humans need the forest, two questions on children's awareness of judgments of current logging practices, and two questions on children's judgments about personal and governmental interventions. This process was similar to that employed in computing the environmental profile. For each question, an affirmative response received a score of one, a negative response a score of zero, and then the scores were summed across the five questions. Results showed that out of a possible score of 5 (the most pro-conservation score), the Manaus children as a group scored 4.0 and the Novo Ayrao children as a group scored 4.20. A t test showed no significant difference between the two groups.

Children's Moral Judgments about Nature: The Case of the Polluted Waterway. Virtually all of the children interviewed in both Manaus (97%) and Novo Ayrao (93%) judged the individual act of throwing garbage in the Rio Negro as not all right. Children maintained their judgments not to throw garbage in the river even in conditions where local conventions legitimated the practice for their entire community (97% and 93%), and for a community in a different geographical location (93% and 86%). Toward assessing conceptions of moral obligation, results showed that 93% of the children in Manaus viewed polluting the river as not all right in all three conditions, compared to 86% of the children in Novo Ayrao. Using Fischer's exact test, no significant differences were found between the two locations.

Children's Environmental Justifications. Children were systematically probed for their reasons on five of their evaluations. The first two evaluations involved whether animals and plants played an important part in their life. The remaining three involved "The Case of the Polluted Waterway." Children's justifications were coded with the categories reported in Table 1. The resulting justification percentages for each of the six questions, separated by location, are reported in Table 3. Averaging

across all six questions, results showed that the majority of justifications were Homocentric (77% and 79% for Manaus and Novo Ayrao respectively), followed by Unelaborated Harm to Nature (19% and 13%), and then Biocentric (4% and 8%). From visual inspection of the data, no notable differences in justification use occurred between locations. The two most frequent subcategories were human welfare (57% and 67%) and aesthetics (14% and 7%).

Insert Table 3 about here

Toward assessing conceptions of moral obligation in the above analyses of "The Case of the Polluted River," three measures were used: prescriptivity, non-contingency on conventional practices, and generalizability. The moral quality of such obligatory judgments are underscored by those justifications that appealed to welfare, intrinsic value of nature, rights, relational, and unelaborated harm to nature. For these justifications (spanning both homocentric and biocentric considerations) turn on issues of harm, justice, and virtue -- issues that in moral philosophy traditionally come under the purview of morality. Accordingly, for children who evaluated as not all right polluting the river in all three conditions, an analysis was conducted that examined the percentage of children who provided moral justifications for their negative evaluations. Results showed that all of the children (100%) provided a moral justification for a least one of their three evaluations (90% for two of the three, 58% for three of the three).

Comparison to the Houston Study's Results. Tables 2 and 3 include a quantitative comparison of the results between the Brazilian study and the comparable parts of the study conducted with the fifth graders in the United States. Statistical comparisons were conducted in two ways. First, the data from each Brazilian location (Manaus and Novo Ayrao) were compared to the data from the United States location. Second, the Brazilian data from both Manaus and Novo Ayrao were combined and then compared to the data from the United States.

These statistical comparisons showed only a few differences between the populations in Brazil and the United States. More Brazilian children (97% and 100%, in Manaus and Novo Ayrao respectively) than United States children (79%) said that plants played an important part in their lives. X^2 (1, $\underline{N}$ = 67) = 6.47, $\underline{p}$ < .01. Fewer Brazilian children (61% and 58%) than United States children (89%) said that they would care if insects were harmed by water pollution. X^2 (1, $\underline{N}$ = 57) = 5.07, $\underline{p}$ < .02. In terms of children's environmental moral justifications, there were two differences. Combining five of the six questions that are summarized in Table 3 (the five questions which are comparable to questions used in the Houston study), children in the Brazilian population used a greater percentage of homocentric Welfare reasoning than did those in the United States population (62% versus 23%). In contrast, children in the United States population used a greater percentage of Unelaborated Harm to Nature reasoning than did those in the Brazilian population (34% versus 14%).

Otherwise, there were no further statistical differences across each of the twelve questions that pertained to children's environmental values, knowledge, and practices (Table 2). Nor was there a statistical difference across children's environmental profile: the Houston children scored 7.8, compared to 7.0 and 7.5 for the Manaus and Novo Ayrao children respectively. In terms of the "Case of the Polluted Waterway" again there were no statistical differences. In brief, based on the three measures that pertain to moral obligation, 100% of the Houston children judged throwing garbage in a waterway as not all right in the three conditions, compared to 93% and 86% of the children in Manaus and Novo Ayrao respectively.

Moreover, it is important to recognize that the coding system developed from the Houston study was robust enough to account for the Brazilian data. Indeed, the very wording of children's reasoning across cultures was often strikingly similar. For illustrative purposes, consider but the following four pair of matched examples:

1A. [It is not all right to throw garbage in the river] because it causes pollution that is dangerous for us. Because now we have cholera, a very dangerous disease and there are others attacking us like the malaria. (Brazilian child)

1B. Because some people that don't have homes, they go and drink out of the rivers and stuff and they could die because they get all of that dirt and stuff inside of their bodies. (Houston child)

Both of the above children reason that is wrong to throw garbage in the local waterway because people might drink from polluted water, and get sick ("now we have cholera, a very dangerous disease"; "they could die").

2A. Because the river was not made to have trash thrown in it, because the river belongs to nature. (Brazilian child)

2B. Because water is what nature made; nature didn't make water to be purple and stuff like that, just one color. When you're dealing with what nature made, you need not destroy it. (Houston child)

Both of the above children base their environmental judgments on the view that nature has its own purposes ("the river was not made to have trash thrown in it"; "nature didn't make water to be purple and stuff").

3A. Because animals have to have their chance. They also must have to live. We should not mistreat them, because if it happens to us, we don't like it. (Brazilian child)

3B. Some people don't like to be dirty. And when they throw trash on the animals, they probably don't like it. So why should the water be dirty and they don't want to be dirty. (Houston child)

Both of the above children judge as wrong the mistreatment of animals based on considering whether humans would similarly like to be treated in that way ("because if it happens to us, we don't like it"; "some people don't like to be dirty...[so the animals] probably don't like it").

4A. Even if the animals are not human beings, for them they are the same as we are, they think like we do. (Brazilian child)

4B. Fish don't have the same things we have. But they do the same things. They don't have noses, but they have scales to breathe, and they have mouths like we have mouths. And

they have eyes like we have eyes. (Houston child)

Both of the above children recognize that while animals are not identical to human beings ("animals are not human beings"; fish don't have the same things we have") that both animals and people have significant functional equivalences (animals "think like we do"; fish "don't have noses, but they have scales to breath").

Discussion

It is sometimes said that environmental efforts to save the Amazon rain forest, if not most environmental efforts world wide, are the product of people in Western countries who have sufficient economic stability – some would say the luxury -- to be concerned about environmental issues. Along this line of reasoning, it is also said that the vast majority of people in developing countries, like Brazil, are largely concerned with survival and economic advancement, not nature. The results from this study, however, offer a different and more complicated perspective on this latter proposition.

The majority of fifth grade urban and rural Brazilian children we interviewed demonstrated environmental sensitivities and commitments based on a wide range of measures. The children were aware of various environmental problems (such as air and water pollution, and the "quemada" -- the large-scale burning of the Amazon jungle). They discussed environmental issues with their family. They believed that throwing garbage in the Rio Negro hurt various parts of the environment (namely, birds, insects, the view, and people who lived alongside the river), and they cared that such harm occurred. The children also demonstrated understandings of and sympathies toward the Amazon rain forest. They believed, for example, that the current logging practices employed in the jungle were wrong, and that the government, and they themselves, should do something to stop the deforestation. Results also showed that children believed that people were morally obligated not to throw garbage in the Rio Negro. Coupled with the justification data, this assessment of moral obligation drew on three measures wherein children's judgments were prescriptive, independent of local conventional practices, and generalizable to people in far off locations.

In Novo Ayrao, many of the village members derived their livelihood by logging the Amazon forest. Yet most of the children interviewed in Novo Ayrao judged such actions as wrong. In Manaus, people in certain neighborhoods routinely threw their garbage in the Rio Negro as their means for its disposal. Yet most of the children interviewed in Manaus judged such actions as a violation of a moral obligation. Thus, in both locations, children disagreed with some of the actual practices of their very community. Such a finding suggests that environmental public policies and education in the Amazon region can build on the environmental sensitivities and committments of the future generation of its adult inhabitants. Moreover, the data from the children in Manaus support the proposition that conventional practices by themselves do not establish the basis for children's obligatory moral judgments (e.g., Helwig, 1995; Killen, 1990; Laupa, 1991; Nucci & Nucci, 1982; Smetana, 1983; Turiel, 1983).

By design, many of the data from the Brazilian study were collected so that they could be directly compared to parts of the study recently completed in the United States with fifth grade African-American children in an urban community in Houston, Texas. The results from this cross-cultural comparison showed several differences. For example, Brazilian children used a greater percentage of Homocentric Welfare reasoning and a lesser percentage of Unelaborated Harm to Nature reasoning than did the children in the Houston population. More Brazilian than Houston children said that plants played an important parts in their lives, and that they would not care if insects were harmed by water pollution. Such differences are compatible with a common place view that rural and urban children in the Amazon region more directly depend upon nature for their physical survival than urban children in the United States.

What is perhaps suprising is not that such differences occurred, but that so few occurred, especially given the wide range of issues investigated. For example, there were only two statistical differences between the groups across 26 separate questions (which formed a large body of both studies), and no statistical differences across the summed scored analysis that comprised the environmental profile. In addition, the coding system that was used to code the Brazilian children's

environmental moral reasoning virtually replicated the system developed in the Houston study, and this system proved robust enough for the task. Indeed, the structure of children's reasoning sometimes almost echoed one another. Recall but one of the matched pairs: One (Brazilian) child said: "Because the river was not made to have trash thrown in it, because the river belongs to nature." Another (Houston) child said: "Because water is what nature made; nature didn't make water to be purple and stuff...."

Taking these differences and similarities together, the results extend recent theorizing in the moral developmental literature. In this literature, a wide body of research supports the proposition that in important ways individuals' moral reasoning across cultures is similarly structured by concerns for human welfare, fairness, and rights. This research includes studies conducted in India (Madden, 1992), Nigeria (Hollos, Leis, & Turiel, 1986), Brazil (Biaggio, 1994), the Virgin Islands (Nucci, Turiel, & Encarnacion-Gawrych, 1983), and Korea (Song, Smetana, & Kim, 1987), to name but a few. This is not to say that moral differences between cultures do not exist; but rather that one needs to be careful in understanding such differences, for often they are not differences in morality, per se, but in personal interests, conventional practices, and factual and metaphysical beliefs (cf. Kahn, 1991; Wainryb, 1991, 1993, in press).

An illustration might prove useful. Shweder, Mahapatra, and Miller (1987) conducted a study in India which they suggest shows important if not incommensurable moral differences between the cultures in India and the United States. They show, for example, that devout Hindus believe that it is immoral for a menstruating woman to sleep in the same bed with her husband or for a widow to eat fish -- beliefs far afield from those commonly held in the United States. But whether such beliefs reflect differences in morality is another matter, as demonstrated by Turiel, Killen, and Helwig (1987) in their reanalysis of part of that data set. It was found, for example, that the reason this Hindu population believed it was immoral for a menstruating woman to sleep in the same bed as her husband was because they believed that menstrual blood was poisonous and that the wife could thereby harm her husband. Similarly, this Hindu population believed that if a widow ate fish, she could hurt her dead

husband's spirit. What seemingly differs between cultures are factual or metaphysical beliefs (e.g., that menstrual blood is poisonous, or that a spirit in an afterlife can be harmed by earthly activity). What appears similar is that actions are structured by moral concern for another's welfare.

In this moral-developmental account, there are partly inherent features in social relations between humans (e.g., that hitting another person causes pain) which presumably help give rise to universal aspects of children's moral reasoning (e.g., that a priori hitting an innocent person constitutes a violation of a moral obligation). Extending this line of reasoning, it may be possible to explain the cross cultural similarities between the Brazilian and Houston populations. Namely, there may be inherent aspects of nature itself which help give rise to children's environmental constructions. In this respect, nature is not a mere cultural convention or artifact, but part of a reality that bounds children's cognition (Soule & Lease, 1995). This explanation is also compatible with the types of differences that were found between cultures in so far as the differences appeared to be tied closely to objective qualities of the environment. Insects in the Amazon region, for example, present more of a danger to human welfare than do insects in cities in the United States.

We are offering a constructivist account – in the Piagetian tradition -- of children's environmental views and values. It is also an account that seems to us complementary to a broad line of research that is occurring outside of developmental psychology on what E. O. Wilson and others have termed biophilia: a fundamental, genetically-based, human need and propensity to affiliate with life (e.g., Katcher & Wilkins, 1993; Kellert, 1993; Nelson, 1993; Ulrich, 1993; Wilson, 1984, 1992, 1993). Consider, for example, that recent studies have shown that even minimal connection with nature -- such as looking at open expanses of trees and grass through a window -- increases productivity and health in the work place, promotes healing of patients in hospitals, and reduces the frequency of sickness in prisons (see Ulrich, 1993 for a comprehensive review of the literature). Other studies have begun to show that when given the option humans choose landscapes such as prominences near water from which parkland can be viewed that fit patterns laid down deep in human history on the savannas of East Africa (Orians, 1986; Orians & Heerwagon, 1992). Wilson (1984) suggests that the biophilic instinct

emerges often unconsciously, in our cognition, emotions, art, and ethics, and unfolds "in the predictable fantasies and responses of individuals from early childhood onward. It cascades into repetitive patterns of culture across most or all societies" (p. 85).

Although it may be premature to speculate, it is our sense that to provide a robust framework for understanding children's relationship with nature, developmental psychology needs to dovetail here with evolutionary biology. We say it may be premature, for the sustained developmental research has yet to be done in this area. It is our hope that this current study can spark such interest, and open up other lines of inquiry.

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Table 1

Summary of Environmental Justification Categories

1. Homocentric

An appeal to how effects to the environment affect human beings. In other words, the environment is given consideration, but this consideration occurs only because harm to the environment causes harm to people.

A. Personal Interests	An appeal to personal interests and projects of self and others, including those that involve recreation or provide fun, enjoyment, or satisfaction (e.g., "animals are important: for instance, in the zoo there are a lot of people who like to see the animals, like myself"; "I think the jungle offers fun, for example, go camping during the weekend").
B. Aesthetic	An appeal to preservation of the environment for the viewing or experiencing pleasure of humans (e.g., "plants are important because they give up a good smell, they are beautiful, very pretty"; "because sometimes we are mesmerized with the beauty of the jungle"; "rivers that are polluted, full of trash, are very ugly").
C. Welfare	An appeal to the physical, material, and psychological welfare of human beings (e.g., "we should preserve the plants and not destroy them because it brings us oxygen and we can survive through it"; "because it causes pollution that is dangerous for us, because now we have cholera, a very dangerous disease, and there are others attacking us like malaria").
D. Punishment Avoidance*	An appeal to punishment or its avoidance (e.g., "because the police might catch her").

Table 1 (continued)

Summary of Environmental Justification Categories

1. Homocentric (continued)	
E. Unelaborated	
2. Biocentric	
An appeal to a larger ecological community of which humans may be a part.	
A. Intrinsic Value	An appeal that nature has value, and the validity of that value is not derived solely from human interests, including is-to-ought appeals (e.g., "because the river was not made to have trash thrown in it, because the river belongs to Nature"; "because the jungle, God made it to live and not to be cut").
B. Rights	An appeal that nature has rights or deserves respect, including appeals wherein humans and nature are viewed as essentially similar (e.g., "because the animals think like us"; "because birds have a life as we do, they have a mother, they are like us"; "plants are born, reproduce, and die as we human beings do").
C. Relational	An appeal to a relationship between humans and nature, including those based on psychological rapport (e.g., because the animals are our friends") and stewardship (e.g., "plants are important to me because we should take care of them, but a lot of people don't do it, they cut them down, so we have to preserve nature"; "because the jungle can't defend itself, somebody has to defend her").

Table 1 (continued)

Summary of Environmental Justification Categories

3. Unelaborated Harm to Nature
An appeal to the welfare of nature (e.g., "because the birds need the water of the rivers to drink and if it gets polluted it kills many birds and animals"; "because it is going to kill the fish, the river is going to be polluted"; "because they are destroying the Amazon jungle"). No reference is made to whether that concern derives from a homocentric or biocentric orientation.

Note. *Although none of the Brazilian children used this justification category of Punishment Avoidance, it was included in the coding manual so as to be particularly sensitive to any moral or environmental orientations based on punishment. The example comes from the Houston study.

Table 2

Percentage of Children's Environmental Values, Knowledge, and Practices

Environmental Criterion	Manaus n = 30 (Brazil)	Novo Ayrao n = 14 (Brazil)	Houston n = 24 (United States)
Animals an important part of your life.	100	100	91
Plants an important part of your life.	97	100	79 **
Aware of environmental problems in general.	69	57	----
Aware of environmental problems affecting self and community.	81	86	80
Discuss environmental issues with family.	62	64	71
Initiate discussions on environmental issues.	31	43	----
Act to help solve environmental problems.	41 *	79	----
Thinks that throwing garbage in a river harms birds.	97	86	96
Cares that birds would be harmed.	96	100	95
Thinks that throwing garbage in a river harms insects.	57	64	68
Cares that insects would be harmed.	61	58	89 **
Thinks that throwing garbage in a river harms the view.	97	100	91
Cares that the view would be harmed.	93	92	95
Thinks that throwing garbage in a river harms people along the river.	93	100	95
Cares that people would be harmed.	89	85	81

Table 2 (continued)

Percentage of Children's Environmental Values, Knowledge, and Practices

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Notes. Children were first asked if they thought harm occurred (to birds, insects, the view, or people). Only those children who thought harm did occur were then asked if they cared about the harm.

--- indicates that a comparable question was not asked of the Houston children.

* indicates a statistical difference between the populations in Manaus and Novo Ayrao ($p < .05$).

** indicates a statistical difference between the populations in Brazil (Manaus and Novo Ayrao) and the United States (Houston) ($p < .05$).

Table 3

Percentages of Environmental Justifications by Categories

	Play an important part in your life						Case of the Polluted Waterway								
	Animals			Plants			Individual			Local Community: given the common practice to pollute			Distant Community: given the common practice to pollute		
Justification Category	M	N	H	M	N	H	M	N	H	M	N	H	M	N	H
Homocentric															
Personal Interest	21	7	35	3	5	8	8	6	8	---	---	6	4	7	3
Aesthetic	17	---	4	27	29	33	---	---	31	7	---	19	7	---	19
Welfare	38	64	26	70	52	42	64	75	18	64	81	25	59	79	19
Punishment Avoidance	---	---	---	---	---	---	---	---	3	---	---	3	---	---	---
Unelaborated	---	---	---	---	---	---	---	---	---	4	6	3	---	---	11
Biocentric															
Intrinsic Value	---	7	---	---	---	---	3	---	3	---	---	3	---	---	---
Rights	14	14	9	---	10	---	---	---	3	---	---	3	---	---	---
Relational	3	7	9	---	5	---	---	---	---	---	---	---	---	---	6
Unelab. Harm to Nature	7	---	17	---	---	17	25	19	40	25	13	39	30	14	42

Notes. M = Manaus (n = 30); N = Novo Ayrao (n= 14); and H = Houston (n = 24). Percentages may not equal 100 due to rounding.